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ART 31 AMM

CLAIMS

1. An auxetic polymeric material which is of filamentary or fibrous form.
2. A method of forming an auxetic material comprising cohering and extruding heated thermoformable particulate polymeric material, wherein cohesion and extrusion is effected with spinning to produce filamentary material having auxetic properties.
3. A method according to claim 2 which is performed substantially without any compaction or sintering stages separate to the extrusion with spinning process.
4. A method according to claim 2 or 3 which is performed substantially without any separate post-extrusion draw stage.
5. A method according to any one of claims 1 to 4 which is performed at a temperature which is high enough to give rise to cohesion of polymer particles sufficient to permit production of filaments, but without causing actual melting and complete coalescence of the particles into a liquid form.
6. A method according to any one of claims 1 to 5 which is performed with rough surfaced particles of irregular shape and size.
7. A method according to claim 6 wherein the particles are up to 300 μ m diameter.
8. A method according to any one of claims 1 to 7 performed using melt extrusion apparatus having a barrel zone, an adapter zone and a die

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zone with an extruder plate, which zones are capable of independent temperature control.

9. A method according to claim 8 wherein the barrel zone itself has three zones, namely feed, compression and metering zones, which are capable of independent temperature control.

10. A method according to claim 8 or 9 wherein the barrel zone contains an extrusion screw.

11. A method according to any one of claims 8-10 wherein extruded filaments from the die are passed around rollers substantially without drawing traction.

12. An auxetic polymeric material of filamentary or fibrous form produced by the method of any one of claims 1 to 11.

13. An auxetic polymeric material according to claim 1 or 12 wherein the polymeric material comprises polypropylene.

14. A fabric formed from an auxetic polymeric material according to any one of claims 1, 12, 13.

15. A fibre-reinforced composite material containing reinforcing fibres which are auxetic polymeric materials according to any one of claims 1, 12, 13.

16. A composite material according to claim 15 used as sound insulation for building walls.

17. A composite material according to claim 15 used as a vehicle body

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part.

18. A composite material according to claim 15 ~~used~~ as a car bumper.
19. Personal protective clothing or equipment made from material comprising an auxetic polymeric material according to any one of claims 1, 12, 13.
20. Personal protective clothing or equipment according to claim 19 in the form of a crash helmet.
21. Personal protective clothing or equipment according to claim 19 which is in the form of a projectile-resistant or bullet proof vest.
22. Personal protective clothing or equipment according to claim 19 which is in the form of a shin pad.
23. Personal protective clothing or equipment according to claim 19 which is in the form of a knee pad.
24. Personal protective clothing or equipment according to claim 19 which is in the form of a glove.
25. A filter made from material comprising an auxetic polymeric material according to any one of claims 1, 12, 13.
26. A rope or cord formed from twisted fibres, said fibres comprising an auxetic polymeric material according to any one of claims 1, 12, 13.
27. A fishnet made from ropes or cords according to claim 26.
28. A replacement biomaterial comprising an auxetic polymeric material according to any one of claims 1, 12, 13.

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29. A bandage or wound pressure pad formed from a material comprising an auxetic polymeric material according to any one of claims 1, 12, 13.
30. A seal or gasket made from a material comprising an auxetic polymeric material according to any one of claims 1, 12, 13.
31. An auxetic polymeric material according to any one of claims 1, 12, 13 incorporating an entrapped, releasable substance in pores thereof.

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